

CLAIMS

1. A photoelectric conversion element, comprising:

a casing; and

5 a stacked body enclosed within the casing,

wherein the stacked body comprises:

a working electrode having a porous oxide semiconductor layer having a sensitizing dye supported on a surface thereof;

10 a counter electrode provided on a side of the porous oxide semiconductor layer of the working electrode facing the working electrode; and

an electrolyte layer disposed on at least a part of which is between the working electrode and the counter electrode, and

15 wherein an upper surface and a lower surface of the stacked body contacts directly or indirectly an inner surface of the casing, the portion of the casing at least contacting the working electrode being made of a material having an optical characteristic of transmitting sunlight.

2. The photoelectric conversion element as recited in claim 1, further comprising an elastic member provided between the counter electrode and the casing.

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3. The photoelectric conversion element as recited in claim 1, further comprising first and second conductive bodies each having one end and another end,

25 wherein the counter electrode is connected to the one end of the first conductive body so that the first conductive body is routed an inside of the casing without contacting a side surface of the stacked body, and the other end of the first conductive body extends outside of the casing, and

wherein the working electrode is connected to the one end of the second conductive body so that the second conductive body is routed an inside of the casing without contacting the side surface of the stacked body, and the other end of the second conductive body

extends outside of the casing.

4. The photoelectric conversion element as recited in claim 3, wherein the other ends of the first and second conductive bodies extend outside of the casing from the side portion of the casing.

5. The photoelectric conversion element as recited in claim 3, wherein the other ends of the first and second conductive bodies extend outside of the casing from the bottom portion of the casing.

6. A method for manufacturing a photoelectric conversion element, comprising the steps of:

providing a casing comprising a housing body having an inner bottom surface and a lid body;

providing a working electrode having a porous oxide semiconductor layer having a sensitizing dye supported on a surface thereof;

forming an electrolyte layer by filling a liquid or gel electrolyte on the porous oxide semiconductor layer of the working electrode;

placing the counter electrode on the inner bottom surface of the housing body of the casing;

overlaying the working electrode on the counter electrode so that the counter electrode contacts the electrolyte layer to form a stacked body;

placing the lid body of the casing on the working electrode over the working electrode; and

applying a load in a direction orthogonal to the surface of the stacked body from an outside of the stacked body to seal the casing.

7. A photoelectric conversion element, comprising:
a housing body having an inner bottom surface; and

a stacked body,

wherein the stacked body comprises:

a working electrode having a porous oxide semiconductor layer having a sensitizing dye supported on a surface thereof;

5 a counter electrode provided on a side of the porous oxide semiconductor layer of the working electrode facing the working electrode; and

an electrolyte layer disposed on at least a part of which is between the working electrode and the counter electrode, and

10 wherein the stacked body is enclosed within the housing body so that the counter electrode contacts directly or indirectly the inner bottom surface of the housing body, and the housing body is sealed using the working electrode.

8. The photoelectric conversion element as recited in claim 7, wherein the working electrode comprises a first substrate, and the first substrate is made of a material having both
15 an optical characteristic to transmit sunlight and a resistance to heat.

9. A method for manufacturing a photoelectric conversion element, comprising the steps of:

providing a casing comprising a housing body having an inner bottom surface;

20 providing a working electrode having a porous oxide semiconductor layer having a sensitizing dye supported on a surface thereof;

forming an electrolyte layer by filling a liquid or gel electrolyte on the porous oxide semiconductor layer of the working electrode;

25 placing the counter electrode on the inner bottom surface of the housing body of the casing so that the counter electrode contacts directly or indirectly the inner bottom surface of the housing body;

overlaying the working electrode on the counter electrode so that the counter electrode contacts the electrolyte layer to form a stacked body;

placing the working electrode over the casing; and

sealing the working electrode to the housing body using laser method or adhesion method to fabricate the casing.

10. A photoelectric conversion element, comprising:

5 a casing; and

a plurality of stacked bodies,

wherein the plurality of stacked bodies are sealed within the casing while being arranged, and each of the stacked bodies comprises:

a working electrode;

10 a counter electrode; and

an electrolyte layer sandwiched between the working electrode and the counter electrode,

wherein the casing comprises a back plate; and a frame body provided on an outer periphery portion of the back plate,

15 wherein the frame body comprises a side wall portion and a window frame portion, and the window frame portion is provided facing the back plate and presses the stacked body in a direction of the back plate, and

wherein the stacked body comprises a current collecting wiring portion, and the window frame portion is provided in a region corresponding to a position of the current
20 collecting wiring portion of the stacked body.

11. The photoelectric conversion element as recited in claim 10, wherein the side wall portion is detachable from the back plate.

25 12. The photoelectric conversion element as recited in claim 10, wherein the window frame portion is detachable from the side wall portion.

13. The photoelectric conversion element as recited in claim 10, further comprising an elastic member provided between the stacked body and the back plate.

14. A photoelectric conversion element, comprising:

a stacked body; and

a casing that encloses the stacked body,

5 wherein the stacked body comprises:

a working electrode;

a counter electrode; and

an electrolyte layer formed between the working electrode and the counter
electrode,

10 wherein the casing comprises a frame body that covers the stacked body and a lid
body that fixes the stacked body to the frame body, and the frame body covers a region of
the working electrode corresponding to a position where the conductive body is formed.

15 15. The photoelectric conversion element as recited in claim 14, wherein the

conductive body is provided on a periphery of the working electrode.

16. The photoelectric conversion element as recited in claim 14, wherein the lid body
is detachably secured to the frame body.

20 17. The photoelectric conversion element as recited in claim 14, further comprising an
elastic member provided between the counter electrode and the lid body.

18. A photoelectric conversion element, comprising:

a stacked body; and

25 a casing that encloses the stacked body,

wherein the stacked body comprises:

a working electrode;

a counter electrode; and

an electrolyte layer formed between the working electrode and the counter

electrode,

wherein the casing comprises a main body that covers the stacked body and a lid body that fixes the stacked body to the main body, and the lid body is detachably secured to the main body.

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19. The photoelectric conversion element as recited in claim 18, further comprising an elastic member provided between the counter electrode and the casing.

20. A photoelectric conversion element, comprising:

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a stacked body; and

a casing that encloses the stacked body,

wherein the stacked body comprises:

a working electrode;

a counter electrode; and

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an electrolyte layer formed between the working electrode and the counter electrode,

wherein the casing is made of a main body that covers the stacked body, and the working electrode is detachably secured to the main body.

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21. The photoelectric conversion element as recited in claim 20, further comprising an elastic member provided between the counter electrode and the casing.